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Project

A review of German biomedical and animal research applications from 2010 to identify how refinements are used in experiments involving rodents

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03/2012 – 02/2015



3R reduce
refine
replace

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By the 1st of January 2013, Directive (2010/63/EU) the single most important new EU regulation on the protection of animals used for scientific purposes will be implemented in national law. All EU Member States will finally be required to fully implement the Principle of the 3Rs. They must ensure refinement of methods used in procedures, eliminating or reducing to a minimum any possible pain, suffering, distress or lasting harm to the animals (Article 4 of the new Directive).

This project was initiated in order to appraise the current situation of Refinement in Germany. Biomedical and animal research applications from all over Germany in 2010 will be examined to assess the refinement methods being used in laboratories throughout the country. Techniques and methods being employed to reduce animal pain, suffering, and lasting harm will be identified. The study will focus on applications involving rats and mice as they are the two most commonly used species in Germany and throughout the world. The primary aim will be to assess the efficacy of proposed anaesthetic and analgesic regimens by examining applications in which rodents undergo surgical procedures. The use of appropriate killing methods and humane endpoints will also be examined. The study will be carried out anonymously, with individual research groups not being identified. The aim of the review is to identify where, within the aforementioned areas of Refinement, improvements can still be made.

There is still a need to further improve anaesthetic and analgetic protocols as well as to implement effective methods to assess pain in laboratory rodents. Past reviews of German biomedical and animal research applications, carried out by Kathrin Herrmann in her role as a member of the Animals Scientific Procedures Inspectorate in Berlin, suggested appropriate refinements to scientific procedures involving rodents were not being consistently used. Worldwide there is also evidence in the peer-reviewed scientific literature that analgesics and appropriate anaesthetic regimens are not being used uniformly. Richardson and Flecknell (2005) examined publications from peer-reviewed journals in order to assess if the laboratory rodents received analgesics postoperatively and to evaluate the appropriateness of the anaesthetic protocols. They noted that reporting of perioperative analgesic use in publications had risen from ~ 3% (beginning of 1990s) to 20% (beginning of 2000), clearly demonstrating that postoperative pain relief in laboratory rodents is still insufficient. Two follow-up investigations (Stokes et al. 2009, Coulter et al. 2009) showed that 63% of all larger laboratory animals (rabbits, pigs, sheep, dogs and non-human primates) received systemic analgesics, but pain relief in laboratory rodents was still low (less than 20 %). The findings of these reviews emphasise that there is still significant capacity and need for improvement with respect to perioperative analgesia and anaesthesia.

The results of this investigation, together with a broad review of the literature on the possibilities and constraints of refinement methods, will provide the basis for recommendations that could help researchers choose the best refinement methods while still being able to obtain their research goals. Also, the recommendations will hopefully facilitate the approval of biomedical research applications by the licensing authorities who have to ensure that experimental procedures are refined to minimise pain, suffering and distress.

Institution

The veterinarian Kathrin Herrmann is running the project. Her work is being supervised by Professor Paul Flecknell and Professor Heidrun Fink.

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Duration

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Kathrin Herrmann

studied Veterinary Medicine in Berlin and Zürich. Since 2007 she has been a Research Fellow at the State Office of Health and Social Affairs in Berlin, the Animals Scientific Procedures Inspectorate, specializing in Animal Welfare and related Ethics. Since April 2011 she has been a Ph.D. student at the Institute of Pharmacology and Toxicology at the School of Veterinary Medicine of Free University in Berlin.



Prof. Dr. Heidrun Fink

studied Medicine at Humboldt-University in Berlin from 1969 to 1974. She was awarded her degree in 1975, and became an MD in the following year. In 1986 she received her post-doctoral lecture qualification in pharmacology and toxicology, and from 1994 to 1998 worked as a full professor (C3) at the Institute of Pharmacology and Toxicology at the Charité Berlin. Since 1998 she has been a full professor (C4) at the School of Veterinary Medicine at the Free University in Berlin as well as Head of the Institute of Pharmacology and Toxicology.



Prof. Paul Flecknell (Ph.D.)

received his degree from Cambridge Veterinary School in 1976. He completed his Ph.D. at the University of London, and is a diplomate at the European Colleges of Veterinary Anaesthesia and Analgesia and Laboratory Animal Medicine. He is an honorary diplomate at the American College of Laboratory Animal Medicine and an honorary Fellow of the Royal College of Veterinary Surgeons. Recently he was awarded an honorary doctorate by the University of Ghent. He is currently Director of the Comparative Biology Centre at Newcastle University and is Professor of Laboratory Animal Science. His main research interests are anaesthesia and analgesia of all species of animals, with particular focus on the development of pain assessment methods.